

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION.

### Improvements in Printing Machines.

We, R. HOE & CO. LIMITED, a company organised under the laws of Great Britain, of 109, Borough Road, London, S.E.1, do hereby declare the nature of this invention (which has been communicated to us by R. Hoe & Co. Inc., a corporation organised and existing under the laws of the State of New York, United States of America, of 504, Grand Street, City, County and State of New York, United States of America), and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in slow down mechanisms for handling products from printing machines.

In certain classes of printing mechanisms, and particularly in modern high speed web printing machines where the web is cut into sheets, difficulty is experienced in accurately handling the sheets or preventing the sheets from smutting in the folder and in the delivery, due to the very high speeds at which these sheets come to the delivery. This is particularly true where the products are delivered to belts or tapes, in that if they are thus delivered at the high speed of the press, there is danger of the products smutting, and difficulty has been experienced with these deliveries from this and other causes.

The main object of the present invention is to provide an improved slow down mechanism, whereby the products are delivered to an intermediate transfer cylinder provided with folding jaws and operating at the high speed of the press. this cylinder delivering the products to one or more delivery cylinders which run at a slower speed, these latter cylinders in turn delivering the products, where desired, to belts or the like.

A further object of the invention is to provide a construction by which the products are thus transferred, in which the parts shall be few in number, and thus simple, and in which a very smooth and even delivery of the product from a high speed press is obtained.

According to the present invention

there is provided in combination means for forwarding a product at high speed, a delivery operating at a lower speed, an intermediate transfer mechanism, comprising folding jaws and sheet taking devices, means for delivering a product to the jaws, and means for operating the sheet taking devices to take a product while held by the jaws and hold the product after it has been released by the jaws, the product being transferred from the sheet taking devices to the lower speed delivery.

The invention is illustrated in the accompanying drawings in which figure 1 is a sectional side view of so much of the folder end of a high speed printing press as is necessary for an understanding of the invention, the parts being shown as delivering to two deliveries:

Figure 2 is a more or less diagrammatic view, partly in section, of parts of the folding and transfer cylinders, showing the sequence of operation when folding the product into the folding jaws and releasing it from the jaws;

Figure 3 is a view somewhat similar to figure 2, showing more or less diagrammatically the sequence of operation when the product is delivered from the transfer cylinder to the delivery cylinder and from the latter to a carrier such as belts;

Figure 4 is a top plan view, partly in section, of the parts shown in figure 3, the view being taken on the broken line 3-3 of that figure and looking in the direction of arrow 4, and

Figure 5 is a detail view illustrating a modification in folding jaws which may be employed under some circumstances, if desired.

Referring now to these drawings, a product, indicated by the letter P, is there illustrated. This product is a cut product, cut by suitable cutting mechanism and coming from a high speed rotary printing machine. The structure of the cutting mechanism and the printing machine is not shown, it being unnecessary for a clear understanding of the invention.

In the particular mechanism selected

to illustrate the invention, the product to be forwarded may be a single product or a collected product. The product will, however, be folded and, as shown, there is provided a folding and collecting cylinder 1 mounted on a shaft 2 suitably supported in side frames of any usual construction, not shown. This cylinder is provided with the usual collecting devices, shown in the form of long grippers 5, 6 and short grippers 7, 8, these grippers being mounted on the usual gripper shafts 9 and operated by operating arms 10 actuated by cams not illustrated. The cylinder 1 is, as shown, a three part collecting cylinder of usual construction, and two sets of collecting grippers are shown, it being understood that there is a third set, not illustrated. This cylinder is provided with tucking blades 11 carried on a shaft 12 and operated in the usual manner by means of arms 13, actuated by cams not illustrated, to fold off the product from the cylinder. This cylinder 1 runs at the high speed of the press, and cooperating with this cylinder 1 is a folding off and transfer cylinder 14 mounted on a shaft 15 suitably supported in the side frames before referred to. This cylinder is provided with a plurality of sets of folding jaws, two such sets being shown, and the cylinder is one and one third the diameter of the collecting cylinder. The folding jaws are alike in construction and the operation and description of one will suffice for all.

Referring first to the construction shown in figures 1 to 4, there is shown a pair of pivoted jaw members 16, 17 mounted on shafts 18, 19. These jaws are, as shown, provided with wide gripping faces, between which the product is tucked by the folding blade and by which it is nipped, these jaws being operated by a cam roll 20, one of which is shown, this roll cooperating with a suitable fixed cam 21. The shafts 18, 19 are supported in heads 22, 23 in the cylinder 14. These folding jaws act to take the product from the collecting cylinder and when the product is first taken it is held by the jaws in a line radial to the cylinder. Co-operating with the jaws are sheet taking devices, shown in the form of grippers 24, these grippers being located closely adjacent the jaws and arranged in sets widthwise of the cylinder, three grippers being shown in the drawing, one of these sets being provided for each of the folding jaws. These grippers are, as shown, arranged in advance of the jaws and while the product is held by the folding jaws it is pressed down by the grippers and, after

the grippers are brought into engagement with the product, the jaws are released.

It will be observed that the grippers in pressing down the product bend the product into a right angle turn, where it is held by the jaws, but when the jaws open this right angle bend is permitted to straighten out, so that the product when delivered from the transfer cylinder lies perfectly flat. This sequence of operation is shown in Figure 2. At position *a* the sheet has just been tucked into the gripper jaws which are closing on the sheet. As the jaws travel around with the cylinder in the direction of the arrow to position *b*, the grippers are opened to take the product, and at position *c* have taken the product, the jaws being closed in these positions. At position *d*, however, the jaws have opened, and the right angle bend formed in the product and indicated at *e* has straightened out, and the product is now being carried under the control of the grippers. If desired, a curved guide 25, shown in dotted lines in Figure 2, may be provided for the product after it is taken by the grippers.

From the transfer cylinder the product is taken to a delivery which runs at a lower speed than the collecting and transfer cylinders 1 and 14, before referred to. This delivery is shown as a pair of delivery cylinders 26, 27 mounted on shafts 28, 29 suitably supported in the side frames of the machine. Each side of the transfer cylinder co-acts with one of these delivery cylinders to deliver a product thereto, and these delivery cylinders are run at a speed lower than that of the cylinder 14, in the particular instance illustrated this speed being one-half that of the latter cylinder. The cylinder 27 is provided with a set of sheet taking grippers 30 mounted on a shaft 31, these grippers being opened and closed by a cam roll 32 co-operating with a fixed cam 33. The delivery cylinder 26 is also provided with grippers 34 on a shaft 35 operated from a cam roll 36, in turn controlled by a fixed cam similar to the cam 33. From the grippers 30 and 34 the product is delivered to any suitable delivery, shown as a travelling carrier in the form of belts or tapes 37, strippers 38 being preferably provided at each delivery cylinder for stripping the product therefrom and insuring its delivery on to the tapes.

The grippers 30, 34 on the delivery cylinders, it will be observed, referring to Figure 4, are shown arranged in offset relation to the grippers 24 on the jaw cylinder 14, two grippers on the delivery cylinders being shown. The grippers 30, 34

34 are normally open to receive the product and they take the product from the grippers 24 on the jaw cylinders at points ahead of the jaw cylinder grippers, as shown in Figure 3, the grippers 24 opening to release the product at the instant the grippers 30, 34 of the delivery cylinders have taken the product. It will be understood that the grippers 24 and the grippers 30 are provided in required numbers across the cylinders.

The grippers 24 on the jaw cylinder are operated to open and close by a pair of cam rolls 39, 40 which co-operate with a cam 41, these cam rolls being carried on shafts 42, 43, these shafts being tied together by links 44, this construction being the same for each set of grippers 24, in the best constructions, the folding jaws 16, 17 are preferably continuous throughout the length of the cylinder, except where they are cut out, as indicated at 45 (Figure 4), for the gripper supports 46, so that an effective clamping surface for the grippers is provided.

In the construction shown in Figures 1 to 4, a pair of folding jaws is shown. Under some circumstances it may be desirable to use a single rocking jaw which co-operates with a stationary abutment, and such a construction is shown in Figure 5, in which the jaw mechanism includes a rocking jaw 47 which clamps the product against a fixed abutment 48 formed in the wall of the cylinder 14; this Figure indicates the cylinders 14 and 27 in the relative position shown in Figure 1.

The various parts may be driven in any suitable manner, through a gear, indicated at 49, on the transfer cylinder 14 and gears 50, 51 on the shafts of the cylinders 26, 27.

With the construction shown and described a very smooth even movement of the folded product from the high speed collecting mechanism to the slower speed delivery is effected, and a movement in which smutting and other injury to the product is avoided.

While the invention has been illustrated in its preferred forms, it will be understood that various changes may be made in the particular construction and arrangement of the parts without departing from the invention as defined in the appended claims.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a delivery mechanism, the combination of means for forwarding a product at high speed, a delivery operating

at a lower speed, an intermediate transfer mechanism, comprising folding jaws and sheet taking devices, means for delivering a product to the jaws, and means for operating the sheet taking devices to take a product while held by the jaws and hold the product after it has been released by the jaws, the product being transferred from the sheet taking devices to the lower speed delivery.

2. A delivery mechanism as claimed in claim 1, comprising an intermediate transfer cylinder, folding jaws on the cylinder and grippers on the cylinder to take a product while held by the jaws and hold the product after it has been released by the jaws, the product being transferred from the grippers to the slower moving delivery.

3. A delivery mechanism as claimed in any of the preceding claims, comprising a folding cylinder operating at high speed and having a folding blade for tucking a product into the jaws.

4. A delivery mechanism as claimed in claim 1 or 2, comprising a folding and collecting cylinder operating at high speed, and having a folding blade for tucking a product into the jaws.

5. A delivery mechanism as claimed in any of the preceding claims, in which the delivery comprises a cylinder having grippers which take the product from the transfer cylinder.

6. A delivery mechanism as claimed in claim 5, in which a pair of delivery cylinders are provided and in which sets of folding jaws and grippers are provided on the transfer mechanism.

7. A delivery mechanism as claimed in any of the preceding claims, in which the delivery cylinder delivers the folded product to belts or tapes.

8. In a delivery mechanism, the combination of a folding and collecting cylinder operating at high speed, a pair of delivery cylinders operating at a lower speed, an intermediate transfer cylinder of greater diameter than the collecting cylinders, oppositely disposed folding jaws on the transfer cylinder, sets of grippers on the transfer cylinder, one for each set of the jaws and arranged adjacent thereto, a folding blade on the folding and collecting cylinder acting to tuck a product into the jaws, means for operating the grippers to take a product while held by the jaws and hold it after it has been released by the jaws, and grippers on the delivery cylinders to which a product is transferred from the grippers on the transfer cylinder.

9. In a delivery mechanism as claimed in claim 6, the combination of a folding and collecting cylinder operating at high

speed, a pair of delivery cylinders operating at a lower speed, an intermediate transfer cylinder, sets of folding jaws on the transfer cylinder, sets of grippers on the transfer cylinders arranged to take a product while held by the folding jaws and hold the product after it has been released by the jaws, and grippers on the delivery cylinder arranged to take a product from the grippers on the transfer cylinder at points ahead of the points at which it is held by the grippers on the transfer cylinder.

10. A delivery mechanism substantially as described with reference to the accompanying drawings. 15

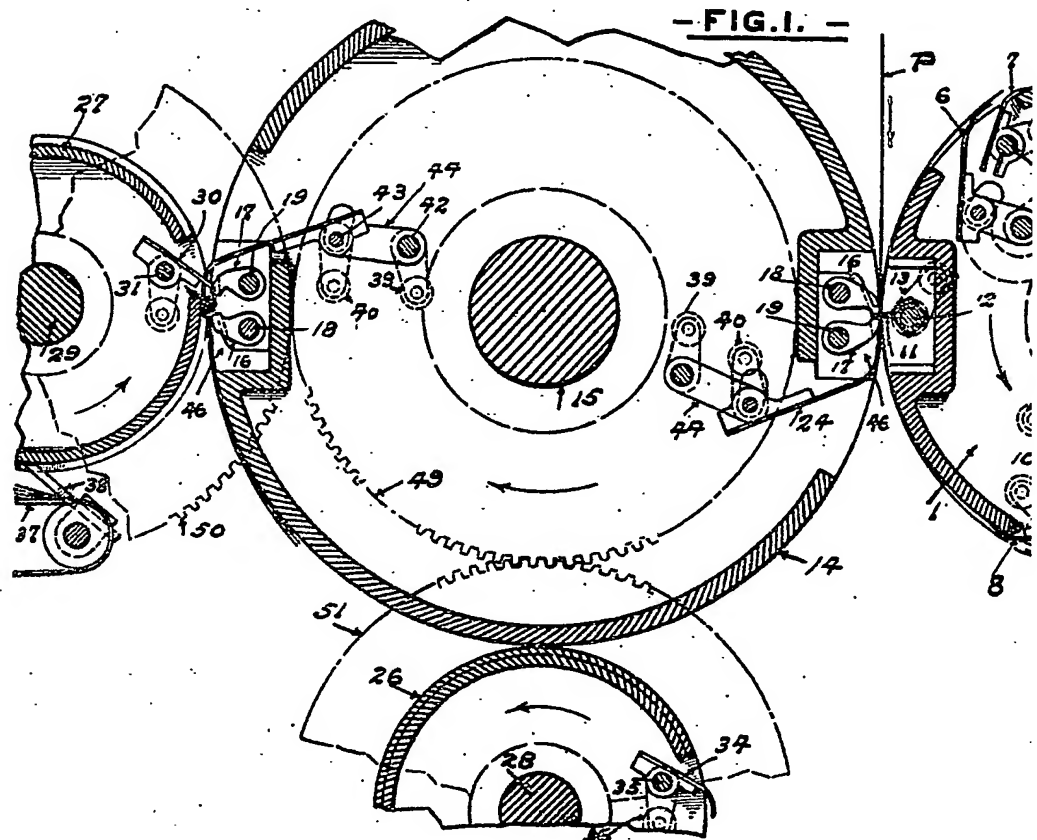
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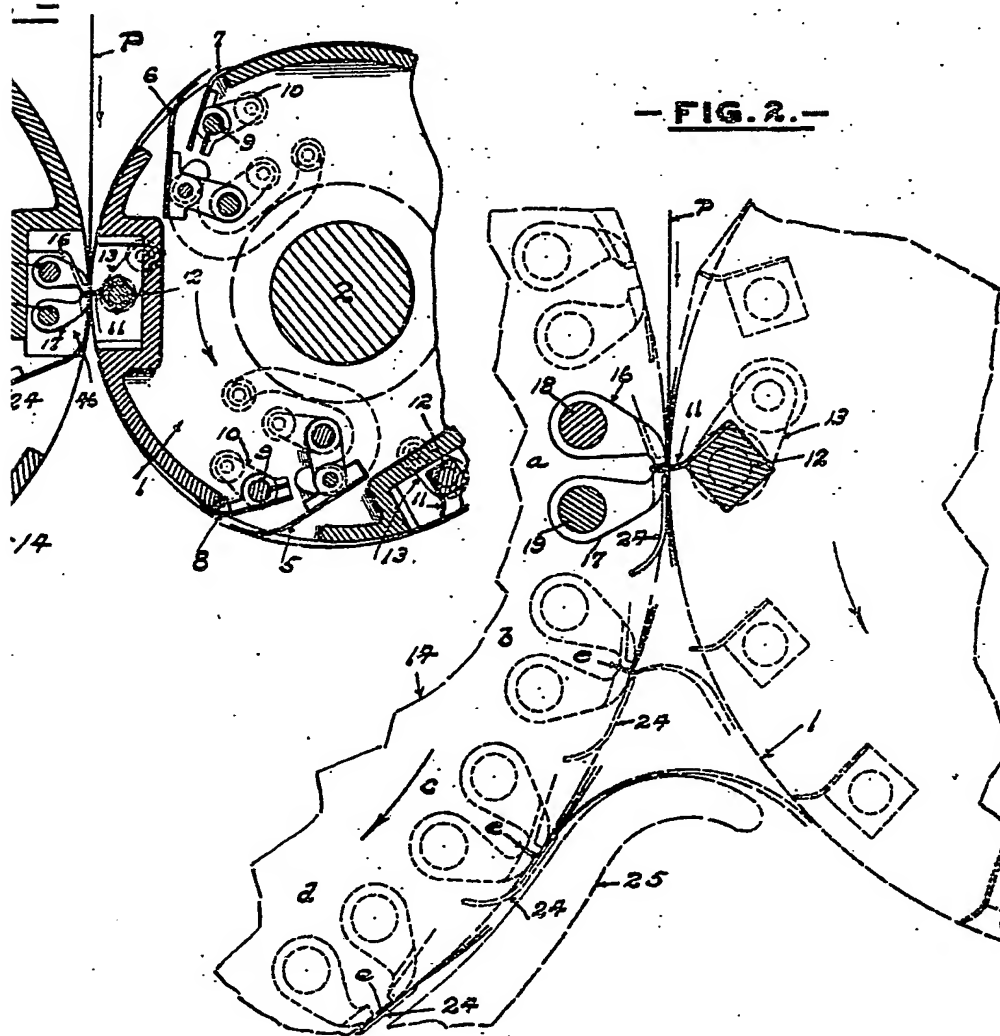
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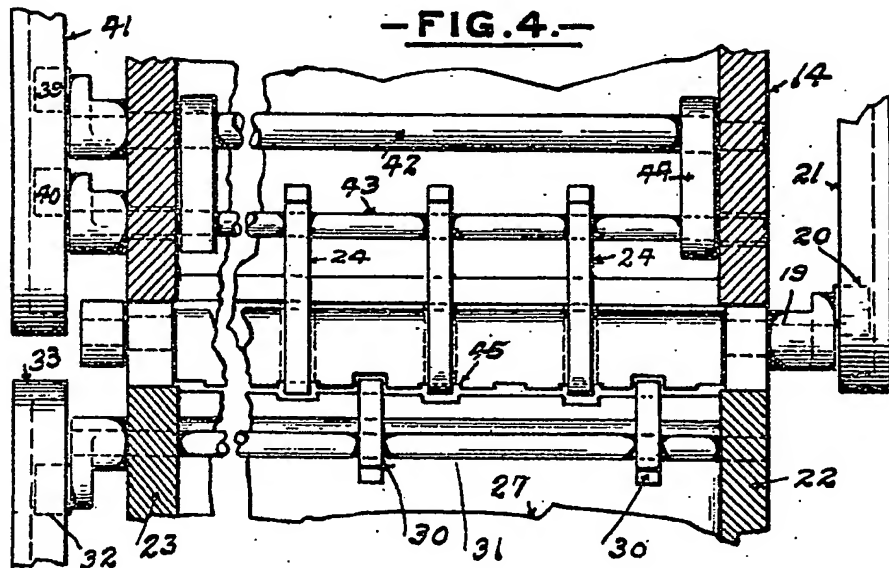
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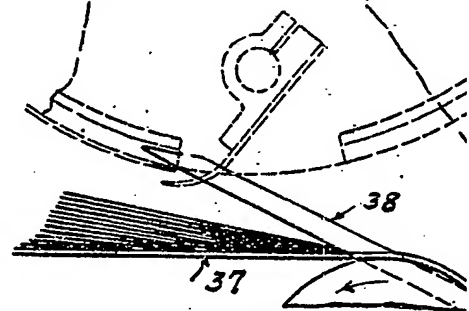
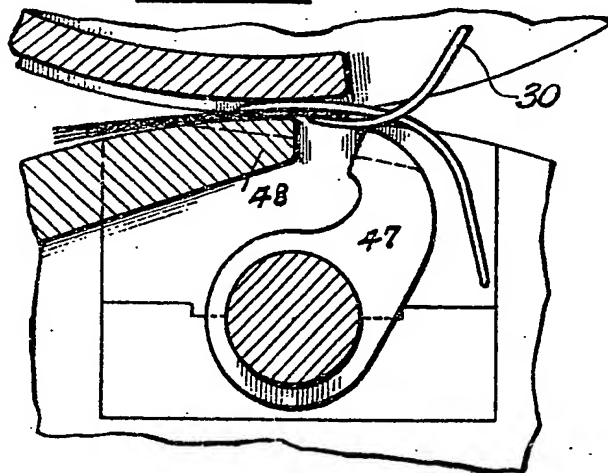




- FIG. 4. -

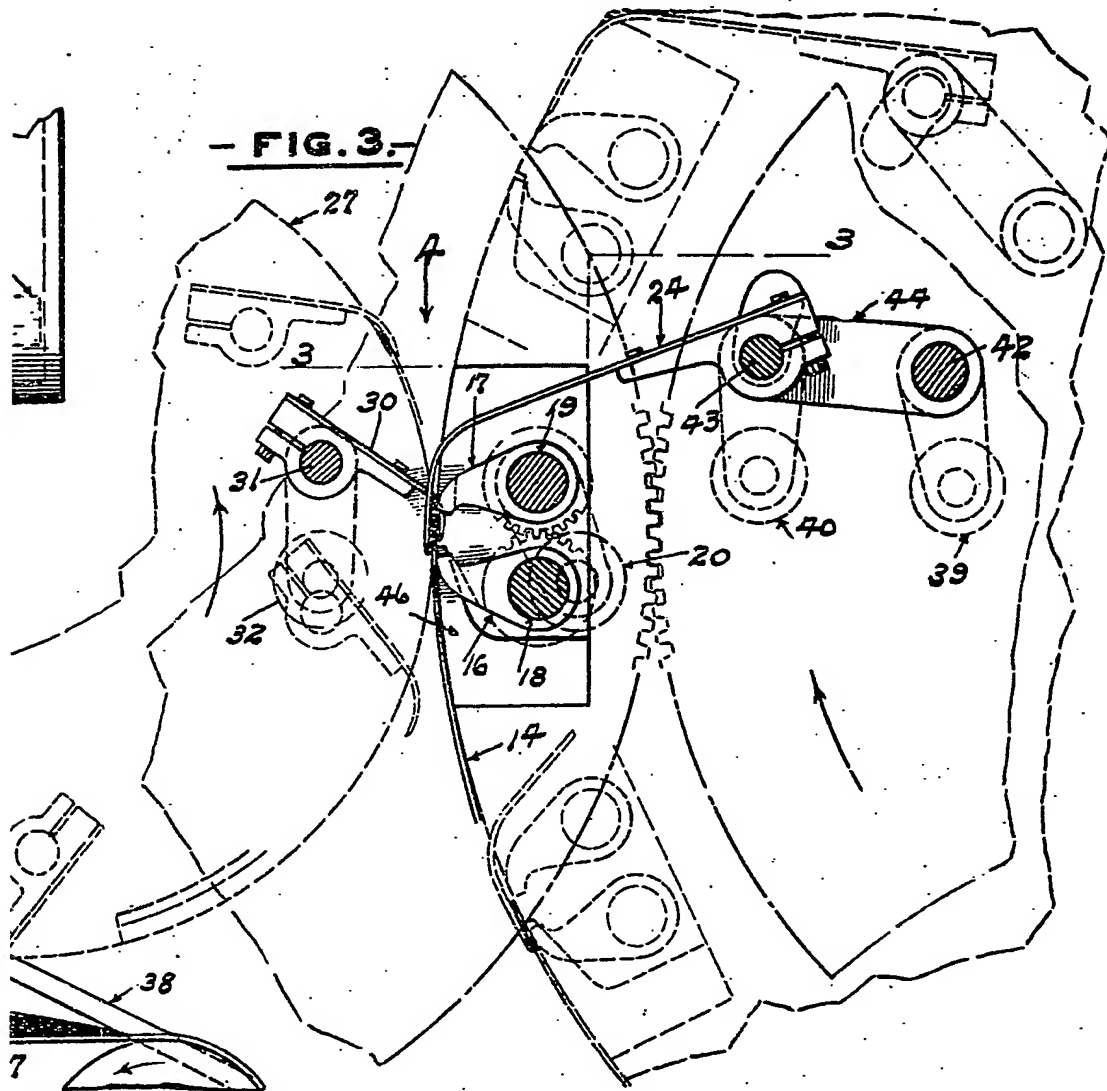


- FIG. 5. -



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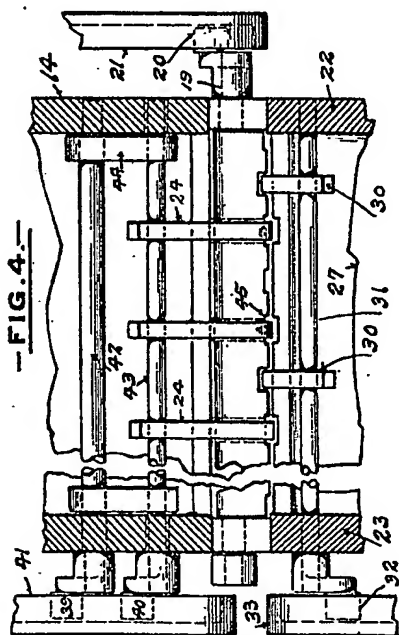


FIG. 4.

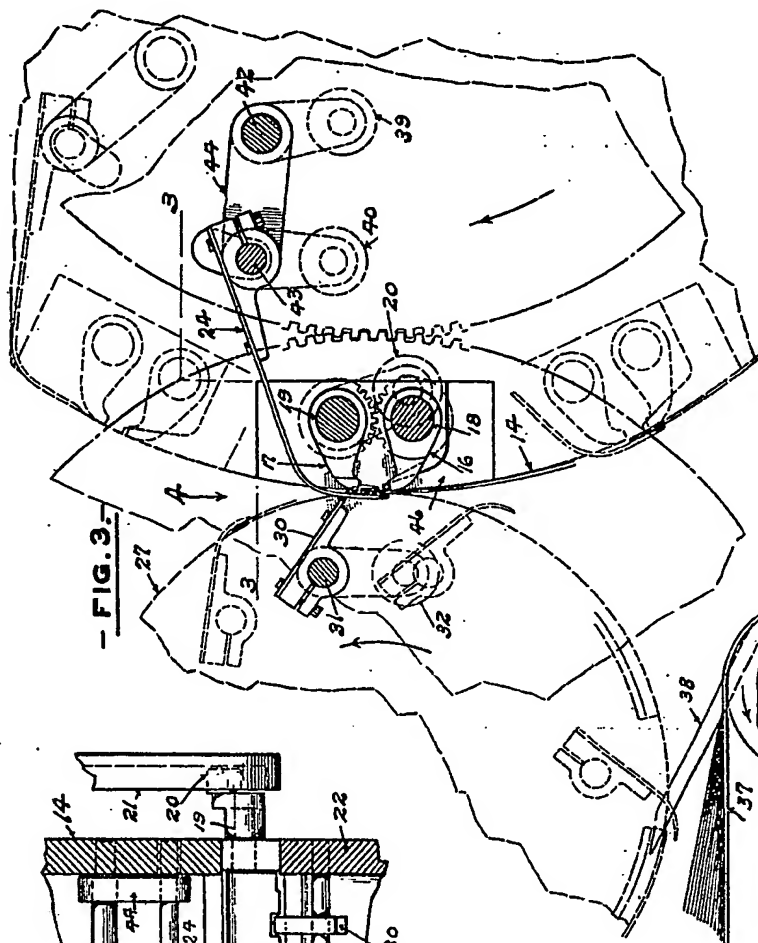
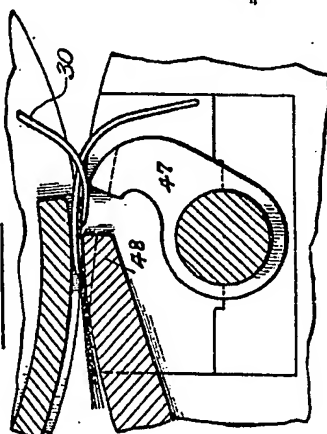


FIG. 3.

FIG. 5.



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